

each said tube run being nested within corresponding aligned slots in said fins with one of said side walls of each tube run located outwardly of the slots in which it is received; and

said headers, said tube runs and said fins comprising a brazed assembly.

32. The heat exchanger of claim 31 wherein said slots are at a substantial angle to the direction of elongation of said fins.

33. The heat exchanger of claim 32 wherein said slots are at about 90° to the direction of elongation of said fins.--

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REMARKS

By the foregoing amendment, non-elected claims 1-12 have been cancelled without prejudice to their being presented in a divisional application. In addition, claims 13 and 28 have been amended solely for the purpose of overcoming the §112 rejection. New claims 31-33 have been added. Claims 13-33 are in the application.

The amendments to the specification are to assure an antecedent for language in new claim 31. New matter is not involved. Elongation of the plate fins is clearly shown in the drawings and described in the written text at page 6, line 12,

for example. The "generally normal" direction of the slots is likewise clearly shown in the drawings and described in the text at page 19, lines 3-5 where a 90° angle is referred to.

Turning to the §112 rejection, the allegedly offending language "the corresponding fin" identified in the Office Action has been changed to --the slots in which it is received--. The original reference was intended to refer to the slots rather than the fin and it is believed that given the prior recitation of a plurality of open-ended tube run receiving slots in each plate fin, there is proper antecedent for the present language.

In addition, though not mentioned by the Examiner, in the same line of claim 13 as originally presented, there is a reference to one of the edges of each tube run being located outwardly of the slot. Elsewhere, the claim defines opposite edges as defining the tube major dimension and interconnecting side walls defining the tube minor dimension. It therefore follows that it is one of the side walls that extends outwardly of the slots, not one of the edges; and the amendment to claim 13 was intended to overcome this deficiency.

As to the amendment to claim 28, the original recitation of "the bight" was believed to be proper since anything that is U-shaped has a bight and the prior recitation of the tubes as being U-shaped would inherently include a bight. However, in order to advance the prosecution, the word "the" has been changed to "a".

The rejection of claims 22, 23 and 25 under §112 for allegedly lacking an antecedent basis for "the slots" is traversed. The claims are part of a string of claims that ultimately depend upon claim 13 which clearly recites slots. Furthermore, claim 21 upon which these claims directly depend specify that slots open to both elongated edges of the plate fins and this recitation of slots clearly provides an antecedent for the term in the following claims. Accordingly, it is believed that there is no basis for a §112 rejection of these claims and withdrawal of the same is solicited.

The rejection of claims 1 [sic 13], 14, and 17 under §102(b) on Young et al is traversed. It is axiomatic that for a §102 rejection to be proper, every requirement of the claims being rejected must be found in a single reference; and when that axiom of patent law is applied to the Young disclosure, it is seen that Young does not provide a proper basis for an anticipation rejection.

In particular, as originally filed, claim 13 specified that the tube run receiving slots are open-ended and that each tube run had part of it extending outwardly of the corresponding fin [sic, slot].

In Young, all of the slots appear to be wholly confined within the associated fin and none are shown to be open-ended. Furthermore, the slots in Young are referred to as tube apertures and apparently the only two references to them specifically are found in the Summary of the Invention at column 2, line 25 and again in the detailed specification at column 5, line 18. Nothing in the written

description even hints at the use of open-ended slots in lieu of the apertures and in a like manner, there is no indicated that a side wall or even an edge of the tube, respectively defining tube minor dimensions and tube major dimensions is located outwardly of such a slot.

Clearly then, there is no anticipation of claims 13, 14 and 17 and the rejection should be withdrawn.

The §103 rejection on Young in view of Slaasted is improper because the rejection fails to deal with the question of open-ended slots as mentioned above.

Similarly, the rejection of claim 9 on Young in view of Larinoff is improper because Larinoff does not disclose slots opening to one elongated edge of elongated fins with part of the tube (its side wall) extending outwardly of the corresponding fin.

The rejection of claim 20 similarly fails because the extension of tubes out of open-ended slots is not shown by either reference. Furthermore, the Examiner has not identified any stiffening bead that extends between an elongated, uninterrupted edge in a plate fin where the slots open to the opposite elongated edge. The mere fact that Scholl shows a ribbed pipe does not suggest the presence of a stiffening rib in a fin which is completely different part of the heat exchanger than the pipe.

New claims 31, 32 and 33 all define over the references for essentially the same reasons set forth above. It is further believed that these claims are generic

to all embodiments of a heat exchanger disclosed in the case and should be properly acted upon.

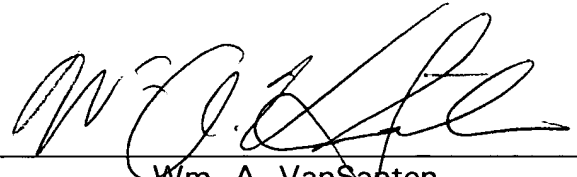
In view of the foregoing, it is believed that both generic claims 13 and 31 are clearly patentable and should be allowed. Given the allowability of claim 13 for the reasons above, it is clear than an action on the merits of claims 15, 18 and 21-30 is likewise in order.

The passing of the case to issue is solicited.

Respectfully submitted,

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SPECIFICATION AS AMENDED

Please delete the first paragraph on page 12, lines 1-3 and replace it with the following:

The fins 26 are arranged in a stack as seen in Figs. 1 and 2 and each fin in the stack has a series of slots 34 that open to one elongated edge 36 of the fin 26 in a direction generally normal to the edge 36. The opposite edge 38 of the fin 26, in the embodiment illustrated in Figs. 1-3, is uninterrupted.

Please delete lines 17-18 on page 13 and lines 1-11 on page 14 and replace them with the following:

The embodiment illustrated in Figs. 1-3, inclusive, illustrates a single tube row heat exchanger. Figs. 4 and 5 show an embodiment that provides two tube rows in the heat exchanger. In the interest of brevity, identical components will not be redescribed and will be given the same reference numerals. In the embodiment illustrated in Figs. 4 and 5, two each of the headers 20, 22 are employed, one for each tube row. Two rows of the tubes 24 are employed as well and a stack of plate fins 50 are utilized. In the embodiment illustrated in Figs. 4 and 5, the slots 34 are formed in two rows, one opening generally normal to one edge 52 of the fin and the other row opening generally normal to the opposite edge 54 of the fins 50. The slots 34 are dimensioned with respect to the tubes 24 in the same

manner mentioned previously and again are provided with louvers 28 between adjacent ones of the tubes 24. Fabrication is as mentioned previously and by suitable plumbing, the rows may be arranged in hydraulic parallel, in series, or may even be utilized to provide cooling for two different fluids if desired.

Please delete lines 16-18 on page 14 and lines 1-9 on page 15 and replace them with the following:

Still another embodiment of the invention is illustrated in Figs. 6-8, inclusive. In this embodiment, two tube rows are formed and they are connected in hydraulic series. Again, like components will not be redescribed in the interest of brevity and will be given the same reference numerals as those used previously. In the embodiment of Figs. 6-8, a heat exchanger much like that illustrated in Figs. 1-3 is formed using the fins 26 that are provided with slots 34 opening generally normal to only one edge 36 of the fins 26. In this embodiment, tubes 56 extend between the headers 20, 22. However, the tubes 56 are considerably longer than those illustrated in the embodiment of Figs. 1-3 for a heat exchanger having the same frontal area and two stacks of the fins 26 are used. Each stack is abutted against a corresponding one of the headers 20, 22 leaving a gap, generally designated 58, in the center of the heat exchanger which is characterized by the absence of the fins.

CLAIMS AS AMENDED

13. (Amended) An aluminum heat exchanger, comprising:

first and second headers;

at least one flattened tube extending between and in fluid communication with said headers and defining a plurality of generally parallel tube runs in spaced relation to one another;

each said tube runs having opposite edges defining a tube major dimension and interconnecting side walls defining a tube minor dimension and a plurality of interior ports;

a plurality of plate fins arranged in a stack and each having a plurality of open ended tube run receiving slots, one for each tube run, each slot having a shape generally that of the cross-section of the tube run to be received therein, a width equal to or just less than the minor dimension of the corresponding tube run and a depth somewhat less than the major dimension of the corresponding tube run;

each said tube run being nested within corresponding slots in said fins with one of said [edges] side walls of each tube run located outwardly of the [corresponding fin] slots in which it is received; and

said headers, said tube runs and said fins comprising a brazed assembly.

28. (Amended) The heat exchanger of claim 27 wherein each of said legs of each of said U-shaped tubes includes a 90° twist immediately adjacent [the] a bight of the corresponding U-shaped tube.